



US DEPARTMENT OF DEFENSE

BLAST INJURY RESEARCH PROGRAM COORDINATING OFFICE

Orthotics and Prosthetics

EACE Research Efforts in Fall Prevention

Researchers at EACE published a number of scholarly works in FY14 on the prevention of falls in individuals with amputations and limb injury. These efforts focused on those with transtibial amputations, a population with decreased walking stability. Safely walking on uneven surfaces at varying speeds is critical to preventing falls and is a major safety concern in prosthetic use. Recent data suggest that the use of a prosthesis with adaptive ankle motion (the Proprio) may assist with walking on slight downhill slopes, while a powered prosthesis provided no distinct advantage over a passive prosthesis in maintaining dynamic balance during stair walking. Additional work is needed to determine the advantages and disadvantages of different types of prosthetics. Preliminary clinical data indicate that multiple rehabilitative strategies utilizing a VR environment (e.g., CAREN) can uniquely train individuals in rapid response techniques to unexpected perturbations (defined as a deviation of a system, moving object, or process from its regular or normal state of path, caused by an outside influence) during ambulation. Additionally, individuals with transtibial amputations were given task-specific fall training on a microprocessor-controlled treadmill. These training exercises have significantly increased confidence and provided a perceived decrease in fall risk for individuals who have sustained an amputation. All these capabilities are critical to a Warfighter's return to duty status and ability for high level activities, while minimizing the risk of secondary injuries.